Q5 Interview - Guido Schreiner, The MathWorks

Tuesday 25 August 2009

*Guido Schreiner, communications and semiconductor industry manager at **The MathWorks**, talks to* Electronics Weekly *about demystifying the terminology of model-based design and explaining its benefits of the time-constrained designer.*

1. What are the benefits of using Model-Based Design for programmable systems?

Let's look at some real user experiences and results first: Harman Becker is reporting a 75% reduction in verification time for complex communication system designs; a leading IC provider is not only reporting a 50% reduction in development time but also that they were able to secure a 60% market share because the product was much earlier on the market compared to their competition.

Other benefits include:
• Being able to separate between high-level algorithm development, and implementation challenges like fixed-point conversion, deployment, and verification on programmable devices.
• Enabling verification much earlier in the design-flow, detecting flaws earlier, and reducing overall development time and cost and improving quality
• Accelerating functional verification by co-simulating with industry-standard tools for embedded software development, HDL simulation, or analogue/mixed signal simulation
• Collaborating with other engineering teams and sharing results with other teams working in different disciplines

2. Model-Based Design has the reputation for being complex. Is this fair?

On the contrary, Model-Based Design actually simplifies the design process and improves the communication between teams working on different parts of a system. By raising the level of abstraction Model-Based Design enables designers to manage the design process for complex systems that span different design disciplines. Look at some real user experiences and results: Engineers at a specific world leader in lifestyle products can validate real-time algorithm designs in less than a day, with no low-level DSP programming; BridgeWave Communications acknowledges that Model-Based Design improved the communication and sharing of work and ideas throughout their development process and teams.

3. How would you demystify Model-Based Design methodologies for the designer?

There may be some mystery about the terminology, but there is really no mystery regarding the actual tools or the methodology. Engineers already perform tasks converting floating-point designs to fixed-point, and they recognize the productivity advantages of using higher levels of abstraction for doing functional design and verification before making target implementation decisions. Model-Based Design with MathWorks products unifies these tasks in a single environment based on MATLAB - de facto language of engineering - for algorithm design and analysis, and Simulink for multidomain system modelling.

Using a large set of high-level building blocks for signal and image processing, communications, and control, engineers can rapidly create models of components and complete systems, and verify designs with simulation, and create a "golden reference" model. Engineers can reuse the "golden reference" as a system-level bench throughout the development process to verify implementations, eliminating time-consuming manual comparison techniques.

4. Do multi-processor systems have an impact on your design methodologies?

There are two key aspects to multi-processor systems. One is the ability of engineers to take advantage of workstations with multi-core or multi-processor CPUs to perform systems designs more efficiently. For this, The MathWorks has created products and technology for parallel and distributed computing that enables engineering teams to utilize more advanced PCs and workstations to create and run simulations faster, and complete their design tasks earlier.

The A - Z of Q5 interviews	
A	ARM chairman, Robin Saxby
B	BSI manager, Simon Bircham
C	CamSemi CEO, David Baillie
D	Design LED, James Gourlay
E	Ensilica, Kevin Edwards
F	Future MD, Danny Miller
G	GSPK Design CEO, P. Marsh
I	Icera CEO, Stan Boland
J	Jennic CEO, Jim Lindop
L	Lumileds, Steve Landau
M	Mentor CEO, Walden Rhines
N	NI president, J. Truchard
O	OLED-T CTO, P.K. Nathan
P	ProVision CEO, David Sykes
Q	QinetiQ, Stephen Lake
R	Rambus CEO, Harold Hughes

Latest distribution news and views

Directive Decoder
Gary Nevison on industry legislation

Electro-Ramblings
EW website blog, flagging new content and features

Chips and Beer
Out on the far flung semiconductor trail

The other aspect of this is the ability of engineers to deploy embedded systems on devices that have multiple cores or multiple processors - including heterogeneous systems that have FPGAs and programmable devices such as DSPs as a part of the target architecture. In this case, the tools and work-flows from The MathWorks enable engineers to start with target-independent functional designs, simulate and partition the designs at a high-level, and then generate C or HDL code for implementation on programmable devices or FPGAs. MathWorks partners provide tools and hardware for a complete development and verification solution.

S	SETsquared, Simon Bond
T	TI CEO, Rich Templeton
U	University of Southampton
W	Wolfson CEO, Dave Shrigley
X	XMOS CEO, James Foster
Z	Zetex CEO, Hans Rohrer

The alpha and omega of electronics industry interviews

5. Has the way the designer uses your packages changed over the years?

Over the year our technologies have evolved in response to the evolution of the needs of our customers, the nature of systems they are building, and the power of their computing platforms. A decade ago, our customers were content to create algorithms and component designs in isolation, leaving implementation, system integration, and testing to be done at the end of the development process.

Now, the pressures of time, cost, and quality, in combination with increasing system complexity, mean that the era of the engineer working in isolation is over. Algorithm developers need to know as early as possible whether their ideas will work in the real world. Hardware and software engineers need more efficient ways to test their designs. All engineers need to understand the impact of other engineers' designs on their own work - whether or not they understand the details. And all engineers need to work faster by taking advantage of multiprocessing computers and clusters.

Today, engineers use our products for complete system-level design, simulation, rapid prototyping, automatic C and HDL code generation, and system-level verification in a variety of industries that develop or use embedded software and electronics, especially when those systems rely on sophisticated signal and image processing, communications, and control algorithms.

Engineers have always relied on the open interfaces available in our software to incorporate legacy code, link to other tools, and acquire data. This capability has evolved to support over 300 third-party hardware and software products, including the leading EDA, embedded software, and test & measurement tools and hardware. This has enabled engineers to easily incorporate Model-Based Design into their own engineering workflows because, rather than being a completely new methodology; Model-Based Design lets users make their own processes much more integrated, efficient and productive.

*See also: Q5 - **Interviews with electronics industry leaders***

Read all the Electronics Weekly Q5 interviews. From ARM's chairman, Sir Robin Saxby, to touchscreen technology firm Zytronic's MD, Mark Cambridge, the business leaders share their particular insights on the UK electronics industry.

Related Articles

- How To: Speaking of porting software
- RS adds latest Agilent 1000 series scope to catalogue
- Interview: Asset InterTech and growth in embedded instrumentation
- Mentor completes LogicVision acquisition
- Amplicon hosting Emerging Technologies seminar

MathWorks Articles

- Q5 Interview - Guido Schreiner, The MathWorks
- In-Depth: Programmable chips - piecing together an analogue solution
- Supersonic Electronics
- Stress out; strain gauges in
- Use alternative approaches to evaluate dc/dc synchronous buck converters